



भारत सरकार
Government of India
जल शक्ति मंत्रालय
Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of WR, RD and GR
केन-बेतवा लिंक परियोजना प्राधिकरण
Ken Betwa Link Project Authority



वसुधैव कुटुम्बकम्
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No: NWDA/CE(N)LKO/T-16(D)/KBLPA/ 634-52

Date:27.02.2024

Sub:Minutes of 7th Meeting of Technical Advisory Group of Ken Betwa Link Project Authority on 17.02.2024 at Lucknow.

The 7th meeting of the Technical Advisory Group of Ken Betwa Link Project Authority (TAG-KBLPA) was held on 17.02.2024 at Lucknow under the chairmanship of Shri D. P. Bhargava, Former Director (Technical), NHPC, Faridabad.

TAG-KBLPA visited the Top Hinged Float Gate installed over Ramial River, Dhenkanal District on 10.02.2024 to discuss on the feasibility of installation for Bariyarpur and Parichha.

Minutes of the meeting, duly approved by the Chairman (TAG-KBLPA) vide email dated 23.02.2024 is enclosed for kind information and further necessary action by all concerned.


(Deepti Verma)
Deputy Director

To: All the Members of TAG of KBLPA

1. Shri D. P. Bhargava, Former Director (Technical), NHPC, Faridabad
2. Shri Y. K. Handa, Former Chief Engineer, CWC
3. The Chief Engineer, Designs (NW&S), CWC, New Delhi
4. Shri V. K. Niranjana, Former HoD & E-in-C, I&WRD, UP
5. Shri G. P. Soni, Chief Engineer, Bodhi, WRD, MP
6. The Director, CSMRS, New Delhi
7. The Director, Hydrology-Central, CWC, New Delhi
8. The ACEO (Design & Planning), KBLPA, UP.
9. The Additional CEO (Head Works)/(Canal), KBLPA

Special Invitee: -

1. The Chief Executive Officer, KBLPA, Bhopal.
2. The Engineer-in-Chief, WRD, Govt. of MP, Bhopal
3. The Engineer-in-Chief (Projects), I&WRD, Govt. of UP, Lucknow
4. The ACEO(Construction), KBLP, I&WRD, Jhansi
5. The Superintending Engineer, KBLP, Banda/Mahoba
6. The Executive Engineer, KBLPA, Jhansi

Copy for kind information to:

1. The Additional Chief Secretary, WRD, Govt. of MP, Bhopal
2. The Principal Secretary, I&WRD, Govt. of UP, Lucknow
3. The Member, D&R, CWC, New Delhi

Minutes of 7th Meeting of Technical Advisory Group of Ken Betwa Link Project Authority held on 17.02.2024 at Lucknow

The 7th meeting of Technical Advisory Group of Ken Betwa Link Project Authority (TAG-KBLPA) was held on 17.02.2024 at Lucknow under the Chairmanship of Shri D. P. Bhargava, former Director (Technical), NHPC, Faridabad to discuss the various issues. The list of participants is attached at **Annexure 7.1**. Prior to the TAG meeting, TAG-KBLPA visited the Top Hinged Float Gate installed over Ramial River, Dhenkanal District on 10.02.2024 to discuss on the feasibility of installation for Bariyarpur and Parichha. The list of participants is attached at **Annexure-7.2**.

At the outset, Chairman welcomed all the participants. After the brief introduction of the participants, item-wise agenda was taken up for discussion.

The details of discussion carried out and the points agreed upon are as under: -

7.1 Compliance to the decisions taken in 6th Meeting of TAG held on 18.09.2023:

Sl. No.	Decision taken in 6 th TAG meeting	Follow up action
1.	<p>Restoration of Ken Main Canal system: TAG inspected the Ken Main Canal on 17.09.2023 and noted the dilapidated condition of the Ken Main Canal system and various structures on the canal such as canal falls, aqueducts, VRBs, regulators etc. where the interventions are required for repair/ restoration. Ken Main Canal system was further discussed in the TAG meeting and a presentation was given by the SE, KBLP, I&WRD, Banda, Govt. of Uttar Pradesh wherein he explained in detail the existing state of the canal system and requirements for repair / renovation and made few recommendations.</p>	<p>The Revised DPR incorporating the recommendations of TAG was submitted by I&WRD, UP on 19.10.2023. As per decision taken in the 2nd meeting of SC-KBLPA, cost component of the DPR has to be appraised by CWC and accordingly, the State Govt. has submitted the DPR through e-PAMS to CWC on 12.12.2023 for appraisal. A PowerPoint presentation was made by I&WRD, UP on 06.01.2024 to CWC on the renovation & modernization works proposed under this DPR.</p> <p>The status of cost appraisal of the DPR was discussed in the 5th meeting of SC-KBLP held on 19.01.2024 wherein Secretary, DoWR, RD&GR, MoJS instructed CWC to complete the cost appraisal by 10.03.2024.</p>

2.	<p>Strengthening and renovation of Bariyarpur PUW, Parichha Weir and Barwa Sagar Dam:</p> <p>The Technical Advisory Group (TAG) of KBLPA visited Parichha Weir, Barwa Sagar Dam on 16/09/2023 and Bariyarpur Pick Up Weir on 17/09/2023 to inspect their existing condition and required intervention as regards their strengthening & renovation. The issue was further deliberated in the 6th TAG meeting and it was suggested that I&WRD, Govt. of UP shall come up with a proposal for strengthening & renovation works based on interactions with relevant agencies.</p>	<p>As per suggestion of TAG, DPRs for Strengthening and renovation of Parichha Weir and Bariyarpur PUW is being prepared and will be submitted for approval.</p>
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7.2 Restoration of Ken Canal System under KBLP, Uttar Pradesh

In reference to the DPR of restoration of Ken Main canal, Chairman, TAG desired that the DPR shall be shared with the TAG, so that it can be seen whether the suggestions made by the TAG has been incorporated or not. ACEO(HQ/P), KBLPA intimated that the DPR submitted by the I&WRD UP was examined with reference to the suggestions made by TAG and same was circulated to all the TAG members.

Chief Engineer, Design (NW&S), CWC intimated that the detailed design of Main Canal and sample structures had not been submitted by the I&WRD, UP. UP I&WRD shall look into the design of the Canal and also the structures to proposed to be renovated. Detailed discussion was held on the design issues canal and its structures.

After discussion I&WRD, UP intimated that these are simple structures, I&WRD, UP has dedicated design wing. It was intimated that the I&WRD will submit the CDO certificate to CWC.

7.3 Repair / Strengthening / Remodeling of Bariyarpur PUW, Parichha Weir, Barwa Sagar Dam along with appurtenant structures.

The TAG in its 6th meeting, considering the dilapidated condition of gates observed during the site visit, had suggested for its renovation / modification / replacement for Bariyarpur PUW and Parichha Weir. In this regard, various alternatives have been explored and it was considered that “Top Hinged Float Gates” could be an option.

M/s Universal Hydro Structures Private Limited, made a presentation on the Top Hinged Float Gates on 30.11.2023 at HQs, NWDA, New Delhi and submitted the proposal to replace the existing outdated falling shutter gates with the latest, state-of-the-art, unique, innovative and highly specialized Top Hinged Float Gates at Bariyarpur PUW and Parichha Weir. A presentation was also made by representative from M/s Universal Hydro Structures Private Limited, during which various issues were discussed. It was decided to compile all the queries and submit the

same to M/s Universal Hydro Structures Private Limited. Final decision on the proposal for installation of Self-Operating Top Hinged Float Gates shall be taken after the reply of the queries is received from the firm. Following are the queries from various members of TAG: -

1. List of all structures where these float gates have been installed especially in US, UK and Europe.
2. Example of any existing such type of gate designed and installed by the said company functioning satisfactorily during floods while maintaining water level at FRL may be shared.
3. Video of operation of these gates during floods may be shared with TAG.
4. Photo of upstream and downstream of the gates with full water level in the reservoir.
5. The list of structures shall also contain details such as number of gates, height of gates, level of water retained and other relevant information.
6. Value of maximum flood per gate, for which gates were designed in the past and total number of gates.
7. To identify the project in each case, gate size and year of installation.
8. Is this design patented. If not, which code is being followed for design.
9. Does these gates have been included in any ICOLD bulletin.
10. Whether the gates are completely leak proof or some tolerance is there like 3-4 lpm.
11. As proposed in Parichha and Bariyarpur weir that existing crest of the masonry stone weir shall be partially cut by non-destructive technique. In this context it may be clarified whether any vibration measuring instruments are proposed to be installed to ensure that the vibrations are under limits and shall not adversely affect the 100-year-old stone masonry structure.
12. In the proposal submitted for Parichha weir, recess for stoplogs has been shown in proposal drawings, which may interfere with gate arms. In this regard it is requested that a workable/operable stoplog arrangement showing their operating procedure, on upstream side of both the Parichha and Bariyarpur weir shall also be submitted for review by the TAG.
13. The weight of bucket will suppress the nappy hence it will no longer be a free flow there over the weir, this will cause some afflux on upstream HFL. What will be this afflux?
14. There is going to be a drag force on the bucket due to the flow. What will be additional afflux due to this?
15. In case discharge over the weir is more than the designed discharge so HFL will also increase. How will this affect the floating gate? What is the upper limit to which bucket can rise? When the pivot arms become horizontal, the weight of gate is balanced entirely from up-thrust acting on inclined face of the bucket. Now if assume bucket rises further, inclination of the water face will reduce as per geometry. This will lead to reduction of up-thrust that means bucket will come back to original position due to weight being more than up-thrust. So, this is stable equilibrium and the bucket cannot move upward from this position. Rising water will enter into the bucket which will further push it down and flow will directly hit the bucket.
16. At the time of flood passing over Parichha weir, the velocity of the flow is more than 5m/s. A heavy gate floating on flowing water of this much velocity will oscillate up and down as

well as sideways. There will be lot of torque and twist on pivot arms. Is this gate has been designed for this range of velocities?

- a. Just to elaborate suppose there were submerged flow conditions downstream with velocity of flow 2m/s, then this hinge gate would have been fine. OK.
 - b. But consider other way round when downstream water level is much below upstream HFL and complete nappy is flowing down with 6m/s velocity. Now this will pose entirely different set of challenges because elastic behavior of the flowing water and hydrodynamic forces will come into play. These will cause oscillations in the gate leading to large amount of torque and twist in pivot arms, jerk and vibrations in trestle columns. Weight of an empty bucket is more than 100 kN and length of pivot arm is 4 meter. Even a small deformation in the pivot arm will make the gate defective and use less. So, are these hinge gates designed for all these conditions?
17. In flood situation when hinged gates are opened fully, to get the turning moments some part of the gates shall remain submerged thereby obstructing some part of overflowing water over the crest level. Will it affect the discharging capacity compared to otherwise free flowing weir? If yes how much? Authenticate with detailed calculations.
 18. Stress conditions at the bottom of concrete block which will be cast after cutting the existing stone masonry in (a) water level upto crest level (b) when gates are fully opened.
 19. Any other details to justify and satisfy the requirement.

A presentation on the design of Parichha Weir was made by UP I&WRD. It was informed by UP I&WRD that the design of the Weir was carried out based on observed flow. Chief Engineer, CWC informed that the design is not to be carried out based on observed flow but on the basis of design flood study. UP I&WRD agreed to conduct the same in consultation with CWC.

It was desired by the Chairman TAG that next meeting may be convened at Jhansi after the clarification on various issues regarding Self-Operating Top Hinged Float Gates are received. Visit to the Parichha weir can also be made at that time by TAG.

The meeting ended with vote of thanks to Chair and all the members present.

Annexure 7.1

List of participants in 7th meeting of Technical Advisory Group for Ken-Betwa Link Project Authority (TAG-KBLPA) held on 17.02.2024 at 11:30 hrs. at Sinchai Bhawan, Lucknow

1	Shri D. P. Bhargava, Former Director (Tech.), NHPC, Faridabad	Chairman
2	Shri Vijai Saran, Chief Engineer, Designs (NW&S), CWC, New Delhi	Member
3	Shri V. K. Niranjana, Former HoD & E-in-C, I&WRD, UP	Member
4	Dr. Manish Gupta, Scientist – E, CSMRS, New Delhi	Member
5	Shri Raj Kumar Mishra, ACEO (Head Works), KBLPA, Bhopal	Member
6	Shri Devesh Shukla, ACEO (Construction), KBLCC, Jhansi representing Chief Engineer (Designs), I&WRD, UP	Member
7	Shri Shiva Prakash, ACEO (HQ/P), KBLPA / ACEO (Canals), KBLPA	Member Secretary

Special Invitee

8	Shri Prashasht Kumar Dixit, CEO, KBLPA
9	Shri Anil Kumar, Engineer-in-Chief & HoD, I&WRD, UP
10	Shri Akhilesh Kumar Sachan, Engineer-in-Chief (Projects), I&WRD, UP
11	Shri Sharad Kumar Singh, Chief Engineer, I&WRD, UP
12	Shri Rahul Kumar Singh, Director, Gates Design (NW&S), CWC
13	Shri Sanjay Mandhana, Managing Director, Universal Hydro Structures Ltd.
14	Shri Adeet Mandhana, Executive Director, Universal Hydro Structures Ltd.

Other Officials

15	Shri D. K. Mishra, SE, KBLCC - Mahoba, I&WRD, UP
16	Shri Sandeep Kumar Khare, SE, KBLCC - Banda, I&WRD, UP
17	Shri Arvind Kumar Sachan, SE, KBLCD - Jhansi, I&WRD, UP
18	Shri Karunesh Kumar, SE, KBLCD - Design, I&WRD, UP
19	Shri Jitendra Kumar, EE, KBLCCD-2, Banda, I&WRD, UP
20	Shri Ashish Kumar Kushwaha, EE, KBLCCD-1, I&WRD, UP
21	Shri Akhilesh Kumar, EE, KBLCCD-1, Mahoba, I&WRD, UP
22	Shri Mayank Raj Singh, EE, KBLCCD-2, Mahoba, I&WRD, UP
23	Shri Ravindra Kumar Verma, EE, KBLCD-2, I&WRD, UP
24	Shri Ashish Ranjan, EE, PIMC Unit-I, I&WRD, UP
25	Shri Gaurav Chaudhary, AE, KBLCC, Banda, I&WRD, UP
26	Shri Abhishek Kumar Adarsh, AE, KBLCD, I&WRD, UP
27	Shri Saurabh Singh, AE, KBLCC, Mahoba, I&WRD, UP
28	Shri Ravi Shankar, AE, KBLCD-1, Jhansi, I&WRD, UP
29	Shri Vinay Mishra, AE, KBLCD-1, Jhansi, I&WRD, UP
30	Shri Aheesh Kumar, AE, O/o ACEO(HQ/P), KBLPA, Lucknow
31	Shri Ashish Swami, AE, KBLPA, Jhansi
32	Shri Vimal Singh, JE, KBLCD-1, Jhansi, I&WRD, UP
33	Shri Shubham Kumar, JE, O/o ACEO(HQ/P), KBLPA, Lucknow
34	Shri Akash Srivastava, JE, O/o ACEO(HQ/P), KBLPA, Lucknow
35	Shri Bhoor Singh Meena, JE, KBLPA, Jhansi
36	Shri Abhayraj Meena, JE, ID, NWDA, Lucknow

Annexure 7.2

List of participants in visit to Top Hinged Float Gate installed over Ramial River, Dhenkanal District on 10.02.2024

- 1 Shri D. P. Bhargava, Former Director (Tech.), NHPC, Faridabad
- 2 Shri V. K. Niranjana, Former HoD & E-in-C, I&WRD, UP
- 3 Shri Prashast Kumar Dixit, CEO, KBLPA
- 4 Shri Shiva Prakash, ACEO (HQ/P), KBLPA representing ACEO (Canals), KBLPA
- 5 Shri Raj Kumar Mishra, ACEO (Head Works), KBLPA, Bhopal
- 6 Shri Devesh Shukla, ACEO (Construction), KBLCC, Jhansi
- 7 Shri Rahul Kumar Singh, Director, Gates Design (NW&S), CWC
- 8 Shri Sanjay Mandhana, Managing Director, Universal Hydro Structures Ltd.
- 9 Shri Adeet Mandhana, Executive Director, Universal Hydro Structures Ltd.
- 10 Shri D. K. Mishra, SE, KBLCC - Mahoba, I&WRD, UP
- 11 Shri Arvind Kumar Sachan, SE, KBLCD - Jhansi, I&WRD, UP
- 12 Shri Jitendra Kumar, EE, KBLCCD-2, Banda, I&WRD, UP
- 13 Shri Akhilesh Kumar, EE, KBLCCD-1, Mahoba, I&WRD, UP
- 14 Shri Ram Singh, AE, KBLPA, Jhansi
- 15 Shri Bhoor Singh Meena, JE, KBLPA, Jhansi